

CLAIMS

1. A method for forming a wiring comprising the steps of:
 - 5 performing a liquid-repellent treatment on a surface;
 - performing selectively a lyophilic treatment on a region of the surface; and
 - forming a wiring on the lyophilic region by dropping a composition including a conductive material.
- 10 2. A method for forming a wiring comprising the steps of:
 - forming a liquid-repellent region on a surface;
 - forming selectively a lyophilic region in the liquid-repellent region; and
 - forming the wiring on the lyophilic region by dropping a composition including a conductive material.
- 15 3. A method for forming a wiring comprising the steps of:
 - forming a liquid-repellent region on a surface by a plasma treatment;
 - forming selectively a lyophilic region in the liquid-repellent region; and
 - forming the wiring on the lyophilic region by dropping a composition including a conductive material.
- 20 4. The method for forming a wiring according to Claim 3, wherein the plasma treatment is performed at a pressure of 100 Torr to 1000 Torr.
5. The method for forming a wiring according to Claim 4, wherein the plasma

treatment is performed under an atmospheric pressure or a pressure in a neighborhood of an atmospheric pressure by using air, oxygen or nitrogen as a treatment gas.

6. The method for forming a wiring according to any one of Claims 2 or 3,
5 wherein the lyophilic region is selectively formed by irradiating the liquid-repellent region with laser light.

7. The method for forming a wiring according to any one of Claims 2 or 3,
wherein a region that is less liquid-repellent than the liquid-repellent region is formed as
10 the lyophilic region.

8. The method for forming a wiring according to any one of Claims 1 to 3,
wherein the composition is dropped by an ink-jetting method.

15 9. A method for forming a wiring comprising the steps of:
forming a liquid-repellent region by forming a film containing fluorine on a surface;
forming selectively a lyophilic region in the liquid-repellent region; and
forming the wiring on the lyophilic region by dropping a composition including
20 a conductive material.

10. The method for forming a wiring according to Claim 9, wherein a Teflon film or a silane coupling agent is formed to form the liquid-repellent region.

11. The method for forming a wiring according to any one of Claims 9 or 10, wherein the lyophilic region is selectively formed by irradiating the liquid-repellent region with laser light.

5 12. The method for forming a wiring according to any one of Claims 9 to 11, wherein a region that is less liquid-repellent than the liquid-repellent region is formed as the lyophilic region.

10 13. The method for forming a wiring according to any one of Claims 9 to 12, wherein the composition is dropped by an ink-jetting method.

14. A method for manufacturing a thin film transistor comprising the steps of:
performing a liquid-repellent treatment on a surface;
performing selectively a lyophilic treatment on a region of the surface; and
15 forming a conductive film on the lyophilic treatment by dropping a composition including a conductive material.

15 16. A method for manufacturing a thin film transistor comprising the steps of:
forming a liquid-repellent region on a surface;
forming selectively a lyophilic region in the liquid-repellent region; and
20 forming the conductive film on the lyophilic region by dropping a composition including a conductive material.

16. A method for manufacturing a thin film transistor comprising the steps of:

forming a first liquid-repellent region by performing a plasma treatment on a surface for forming a gate electrode;

forming selectively a first lyophilic region in the first liquid-repellent region;

forming the gate electrode in the first lyophilic region by dropping a composition including a conductive material;

5 forming a second liquid-repellent region by a plasma treatment on a surface for forming a source electrode and a drain electrode;

forming selectively a second lyophilic region in the second liquid-repellent region; and

10 forming the source electrode and the drain electrode in the second lyophilic region by dropping a composition including a conductive material.

17. A method for manufacturing a thin film transistor comprising the steps of:

forming a first liquid-repellent region by performing a plasma treatment on a substrate;

15 forming selectively a first lyophilic region in the first liquid-repellent region;

forming a gate electrode in the first lyophilic region of the substrate by dropping a composition including a conductive material;

forming a gate insulating film to cover the gate electrode;

20 forming a semiconductor film over the gate electrode;

forming a semiconductor film having one conductivity over the semiconductor film;

forming a second liquid-repellent region by a plasma treatment on the semiconductor film having one conductivity and the gate insulating film;

forming selectively a second lyophilic region in the second liquid-repellent region; and

forming a source electrode and a drain electrode in the second lyophilic region of the semiconductor film having one conductivity and the gate insulating film by dropping a composition including a conductive material.

18. A method for manufacturing a thin film transistor, comprising the steps of:

10 forming a source electrode and a drain electrode;

forming a semiconductor film over the source electrode and the drain electrode;

forming a liquid-repellent region by performing a plasma treatment on a surface for forming a gate electrode in an upper portion the semiconductor film;

15 forming selectively a lyophilic region in the liquid-repellent region; and

forming the gate electrode in the lyophilic region of the surface of the gate electrode by dropping a composition including a conductive material.

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19. A method for manufacturing a thin film transistor, comprising the steps of:

forming a source electrode and a drain electrode over a base film;

forming a semiconductor film over the source electrode and the drain electrode;

20 forming a first liquid-repellent region by performing a plasma treatment on the semiconductor film;

forming selectively a first lyophilic region in the first liquid-repellent region;

forming a mask in the lyophilic region of the semiconductor film by dropping a composition including a material of the mask;

patterning the semiconductor film by using the mask;

- forming a gate insulating film to cover the semiconductor film;
- forming a second liquid-repellent region by performing a plasma treatment on the gate insulating film;
- forming selectively a second lyophilic region in the second liquid-repellent region; and

5 forming a gate electrode in the second lyophilic region of the gate insulating film by dropping a composition including a conductive material.

20. A method for manufacturing a thin film transistor comprising the steps of:

- 10 forming a first liquid-repellent region by performing a plasma treatment on a base film;
- forming selectively a first lyophilic region in the first liquid-repellent region;
- forming a source electrode and a drain electrode in the first lyophilic region of the base film by dropping a composition including a conductive material;
- 15 forming a semiconductor film over the source electrode and the drain electrode;
- forming a second liquid-repellent region by a plasma treatment on the semiconductor film;
- forming selectively a second lyophilic region in the second liquid-repellent region;
- 20 forming a mask in the second lyophilic region of the semiconductor film by dropping a composition including a material of the mask;
- patternning the semiconductor film by using the mask;
- forming a gate insulating film to cover the semiconductor film;
- forming a third liquid-repellent region by performing a plasma treatment on the

gate insulating film;

forming selectively a third lyophilic region in the third liquid-repellent region;

and

forming a gate electrode in the third lyophilic region of the gate insulating film

5 by dropping a composition including a conductive material.

21. The method for manufacturing a thin film transistor according to any one of Claims 14 to 20, wherein the liquid-repellent region is formed by forming a CF₂ bond on the surface by the plasma treatment.

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22. The method for manufacturing a thin film transistor according to any one of Claims 14 to 21, comprising the steps of:

forming an interlayer insulating film over the thin film transistor;

forming an opening portion in the interlayer insulating film;

15 forming a liquid-repellent region in a surface of the opening portion and the interlayer insulating film by performing a plasma treatment on the interlayer insulating film in which the opening portion is formed;

forming selectively a lyophilic region in the opening portion of the liquid-repellent region; and

20 forming a wiring to be connected to a source electrode or a drain electrode of the thin film transistor through the opening portion by dropping a composition including a conductive material.

23. The method for manufacturing a thin film transistor according to any one of

Claims 14 to 22, wherein the liquid-repellent region is irradiated with laser light to selectively form the lyophilic region.

24. The method for manufacturing a thin film transistor according to any one of
5 Claims 14 to 23, wherein the composition is dropped by an ink-jetting method.

25. A method for manufacturing a thin film transistor, comprising the steps of:
10 forming a film containing fluorine;
forming selectively a lyophilic region in the film containing fluorine;
forming a gate electrode on the lyophilic region by dropping a composition
including a conductive material; and
performing a heat treatment for baking the gate electrode, and removing the
film containing fluorine by the heat treatment.

15 26. A method for manufacturing a thin film transistor comprising the steps of:
forming a first film containing fluorine;
forming selectively a liquid-repellent region in the first film containing
fluorine;
20 forming a gate electrode in the lyophilic region by dropping a composition
including a conductive material;
performing a heat treatment to bake the gate electrode, and removing the first
film containing fluorine by the heat treatment;
forming a gate insulating film to cover the gate electrode;
forming a semiconductor film over the gate electrode;

forming a semiconductor film having one conductivity over the semiconductor film;

forming a second film containing fluorine over the semiconductor film having one conductivity and the gate insulating film;

5 forming selectively a second lyophilic region in the second film containing fluorine;

forming a source electrode and a drain electrode in the second lyophilic region of the semiconductor film having one conductivity and the gate insulating film by dropping a composition including a conductive material; and

10 performing a heat treatment to bake the source electrode and the drain electrode, and removing the second film containing fluorine by the heat treatment.

27. The method for manufacturing a thin film transistor according to Claim 25 or 26, wherein a film including a Teflon or a silane coupling agent is formed as the film 15 containing fluorine.

28. The method for manufacturing a thin film transistor according to any one of Claims 25 to 27, comprising the steps of:

forming an interlayer insulating film over the thin film transistor;

20 forming an opening portion in the interlayer insulating film;

forming a liquid-repellent region in a surface of the opening portion and the interlayer insulating film by performing a plasma treatment on the interlayer insulating film in which the opening portion is formed;

forming selectively a lyophilic region in the opening portion of the

liquid-repellent region; and

forming a wiring to be connected to a source electrode or a drain electrode of the thin film transistor through the opening portion by dropping a composition including a material of the wiring.

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29. The method for manufacturing a thin film transistor according to any one of Claims 25 to 28, wherein the liquid-repellent region is irradiated with laser light to selectively form the lyophilic region.

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30. The method for manufacturing a thin film transistor according to any one of Claims 25 to 29, wherein the composition is dropped by an ink-jetting method.

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31. A droplet discharging method, comprising the steps of:
forming a lyophilic region by irradiating selectively on an object to be treated
in which a liquid-repellent region is formed with light by a light irradiation unit; and
discharging a droplet onto the lyophilic region by a droplet discharging unit, in
a treatment chamber including the droplet discharging unit and the light irradiation unit.

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32. A droplet discharging method, using a treatment apparatus in which a first treatment chamber having a plasma unit and a dielectric, and a second treatment chamber having a droplet discharging unit and a light irradiation unit, comprising the steps of:

forming a liquid-repellent region in an object to be treated by the plasma unit
and the dielectric in the first treatment chamber;

transporting the object to be treated into the second treatment chamber without being exposed to the atmosphere;

forming selectively a lyophilic region in the object to be treated in which a liquid-repellent region is formed by the light irradiation unit in the second treatment

5 chamber; and

discharging a droplet onto the lyophilic region by the droplet discharging unit.

33. The droplet discharging method according to Claim 31 or 32, wherein the droplet discharging unit and the light irradiation unit are integrally formed.

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34. The droplet discharging method according to any one of Claims 31 to 33, wherein the light irradiation unit includes laser light.

35. The droplet discharging method according to any one of Claims 31 to 34,
15 wherein the composition is dropped by an ink-jetting method.